SUPPLEMENTARY NOTE ON THE NUDIBRANCHIA COLLECTED IN THE VICINITY OF THE AMAKUSA MARINE BIOLOGICAL LABORATORY[1]

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EIGHT FIGURES

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I. INTRODUCTION

Since the preparation of my previous paper (Annot. Zool. Japon., Vol. 14, No. 1, 1933, pp. 165–179), 12 more species of Nudibranchiate mollusks have been found in the vicinity of the Amakusa Marine Biological Laboratory. They are as follows:

Nudibranchia
Tribe Holohepatica
Family Duvauceliidæ
1. *Duvaucelia irrorata* (Bergh)
Family Polyceridæ
Subfamily Polycerinæ
2. *Gymnodoris japonica* (Baba)
Subfamily Goniodoridinæ
3. *Goniodoris castanea* Alder and Hancock
Family Doridídæ
Subfamily Discodoridinæ
4. *Discodoris concinna* (Alder and Hancock)
5. *Discodoris pardalis* (Alder and Hancock)
Subfamily Thorunninæ
6. *Rostanga muscula* (Abraham)
Subfamily Dendrodoridinæ
7. *Dendrodoris* (*Doriopsilla*) *miniata* (Alder and Hancock)

1 Contributions from the Zoological Laboratory, Kyûshû Imperial University, No. 50. Papers from the Amakusa Marine Biological Laboratory, No. 34.

Tribe Cladohepatica
Family Bornellidæ
8. *Pseudobornella orientalis* Baba
Family Fimbriidæ
9. *Melibe vexillifera* Bergh
Family Tergipedidæ
10. *Cuthona bicolor* Bergh
Family Aeolidiidæ
Subfamily Phyllodesmiinæ
11. *Phyllodesmium hyalinum* Ehrenberg
Subfamily Aeolidiinæ
12. *Baeolidia japonica*, nov. sp.

II. DESCRIPTIONS OF SPECIES

1) *Duvaucelia irrorata* (Bergh), 1905 (Fig. 1)

Tritonia irrorata Bergh, Siboga-Exped., 1905, p. 205, Taf. 18, figg. 29–32.

The body (fig. 1, a) in life is about 60 mm in length. The head is expanded anteriorly to form a pair of frontal veils, the margins of which are provided with arborescent processes about 6 in number each. On the top of the head there are a pair of rhinophores; the margin of the rhinophore-sheath is crenulated. The branchiæ are arborescent and are arranged on both sides of the back. Granular processes are scattered on the back and sides of the body. The anterior margin of the foot is rounded and is grooved transversely.

The back is sprinkled with dark brown, dark yellowish white, grayish white and dark reddish white mottles, bluish spots and dark reticulations, on the dark yellowish green background. The sides of the body bear grayish white granules, bluish spots and dark reticulations on the dark yellowish green background. The sole of the foot is fleshy in colour.

There are a pair of jaw-plates (fig. 1, b) which are narrow and jagged at the masticatory edges. The radula formula (fig. 1, c) is 40 × 25. 1. 1. 1. 25. The central tooth bears 1 lateral cusp on either side of the middle one. The innermost lateral tooth is clumsy in formation, and the rest of the lateral teeth are all hamate.

Our specimen is identified here with *Duvaucelia irrorata* (Bergh), recorded from the East Indies, (1) by the external form of the body, (2) by the characters of the radula (except for the number of lateral

teeth which are said to be 70 in the original specimen) and (3) by the jaw-plates with jagged edges.

Loc. Tomioka Bay (May 12, 1933; 1 specimen).

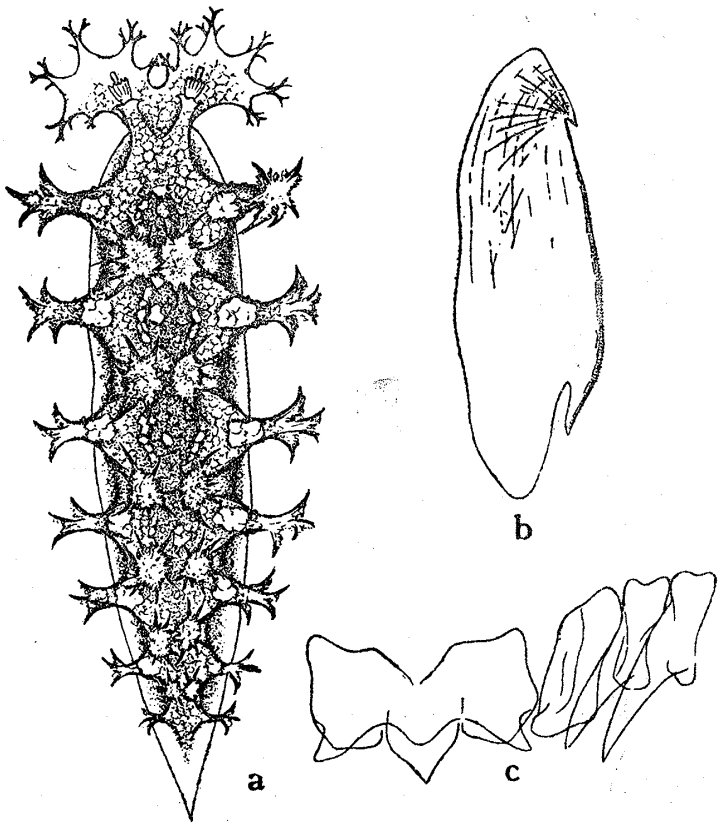

Fig. 1.—*Duvaucelia irrorata* (Bergh). a. Dorsal view. × 1. b. Jaw-plate. × 7. c. Radula. × 100.

2. *Gymnodoris japonica* (Baba), 1930

Trevelyana japonica Baba, Venus, Vol. 2, no. 2, 1930, pp. 46–47, Pl. 2, figs. 8–10.

This species was recorded originally from Enoshima.

Loc. Tomioka Bay (rather common in spring).

3. *Goniodoris castanea* Alder and Hancock, 1846

Goniodoris castanea Alder and Hancock, Monogr. Brit. Nudib., Pt. 3, 1846, Fam. 1, Pl. 19, figs. 1–10; Bergh, Mal. Blätt., Bd. 2, 1880, pp. 126–135, Taf. 4, figg. 14–21; Suter, Man. New Zeal. Moll., 1913, p. 557; Baba, Venus, Vol. 2, no. 2, 1930, pp. 44–45, Pl. 2, figs. 3–4.

Goniodoris sp. Hirasé, Mollusca, 1927, p. 1473, fig. 2833.

This species occurs in the Atlantic, Mediterranean and Pacific waters.

Loc, Tomioka Bay (Mar. 14, 1933; 1 specimen).

4. *Discodoris concinna* (Alder and Hancock), 1864 (Fig. 2)

Doris concinna Alder and Hancock, Trans. Zool. Soc. London, Vol. 5, pt. 3, 1864, p. 118, Pl. 28, figs. 4–6.

Discodoris concinna Eliot, Journ. Coll. Sci. Imp. Univ. Tôkyô, Vol. 35, art. 1, 1913, pp. 8–9.

This species is known to occur in the Indian Ocean and the waters washing the Pacific coasts of Japan. The body (fig. 2, a) in life is oval, soft and is about 80 mm long by 40 mm wide. The back is covered with small granules. The rhinophore-sheath is somewhat elevated. The branchiæ are formed of 5 plumes of unequal sizes and the branchial pocket is elevated slightly. The anterior margin of the foot is grooved transversely, the upper lip being notched in the middle. The mouth is provided with an oral tentacle on either side.

The back bears dark brown mottles on the brownish background. The under surface of the mantle and the pedal sole are blotched with dark brown on a pale brownish ground-colour.

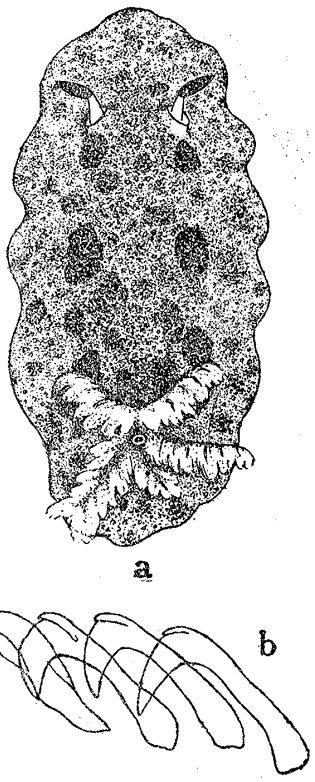

Fig. 2.—*Discodoris concinna* (Alder and Hancock). a. Dorsal view. ×¾. b. Radula. × 100.

There are a pair of labial armatures which are formed of irregular rods. The radula formula (fig. 2, b) is 45 × 55.0.55. The innermost lateral tooth is simple and the rest of the lateral teeth are all hamate and smooth.

Loc. Tomioka Bay (Jul. 7, 1933; 1 specimen).

5. *Discodoris pardalis* (Alder and Hancock), 1864 (Fig. 3)

Doris pardalis Alder and Hancock, Trans. Zool. Soc. London, Vol. 5, pt. 3, 1864, p. 117, Pl. 28, fig. 3.

The body (fig. 3, a) in life is elliptical, soft in consistency and measures about 50 mm in length. There are reticulate figures formed of rather prominent granules on the back which is covered with minute granules. The margin of the rhinophore-sheath is elevated and knobbed. The branchiæ are formed of 6 plumes, the posterior one on either side being subdivided into 2. The mouth bears a pair

of oral tentacles. The foot is grooved anteriorly and the upper lip is notched in the middle.

The back is yellowish brown with dark brown mottles and somewhat grayish reticulate figures. The upper surface of the foot is mottled with dark brown, while the under surface is tinged with yellowish brown.

There are a pair of labial armatures, the elements of which are irregular and rod-like. The radula formula (fig. 3, b) is 25 × 40.0.40; the teeth are all hamate and smooth. The vas deferens is without armatures.

Loc. Tomioka Bay (April 27, 1933; 1 specimen).

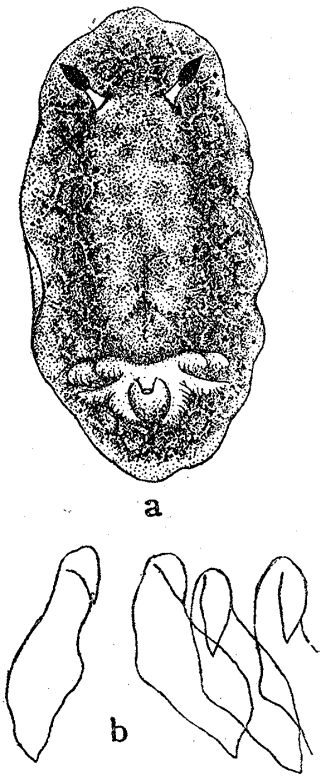

Fig. 3.—*Discodoris pardalis* (Alder and Hancock). a. Dorsal view. × 1. b. Radula. × 100.

6. *Rostanga muscula* (Abraham), 1877

Doris muscula Abraham, Proc. Zool. Soc. London, 1877, p. 256, Pl. 29, figs. 6, 7; Eliot, Proc. Mal. Soc. London, Vol. 7, 1907, pp. 339–341, Pl. 28, fig. 3; Eliot, Journ. Coll. Sci. Imp. Univ. Tôkyô, Vol. 35, art. 1, 1913, p. 20; Suter, Man. New Zealand. Moll., 1913, pp. 566–567. Pl. 23, figs. 23, a-d.

Rostanga pulchra MacFarland, Proc. Biol. Soc. Washington, Vol. 18, 1905, pp. 40–41.

Doris rubicunda Cheeseman, Trans. Inst. New Zealand, Vol. 13, 1881, p. 222.

This orange-yellow species is widely distributed from New Zealand to California. In Japan it is commonly found in the waters washing the Pacific coasts from Tomioka to as north as Asamushi.

Loc. Tomioka Bay (May 6, 1933; 1 specimen).

7. *Dendrodoris* (*Doriopsilla*) *miniata* (Alder and Hancock), 1864 (Fig. 4)

Doridopsis miniata Alder and Hancock, Trans. Zool. Soc. London, Vol 5, pt. 3, 1864, p. 130, Pl, 31, figs. 18, 19.

Doriopsilla miniata Eliot, Proc. Zool. Soc. London, pp. 665–666, Pl. 47, figs. 4, 6.

The body (fig. 4) in life is oval, being about 40 mm long by 25 mm wide. The mantle is expanded and the margin is wavy. There are

bundles and reticulations formed of spicules in the integument of the back. The rhinophores are in a pair and the branchiæ are formed of 5 plumes. The anus is somewhat excentrical in position, being located between the anterior and posterior branchial plumes on the left side. The margin of the branchial pocket is elevated slightly. The mouth is small and pore-like; the anterior margin of the foot is grooved transversely and the upper lip is notched in the middle.

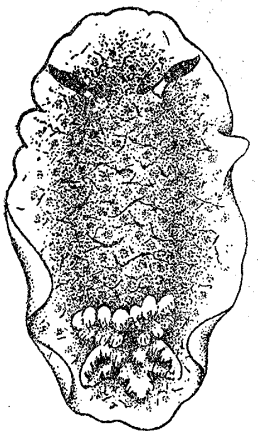

Fig. 4. — *Dendrodoris miniata* (Alder and Hancock). × 1.

The back is of a uniform orange-yellow colour with whitish reticulations which are due to the presence of spicules imbedded in the integument. The under surface of the body is also orange-yellow.

The mouth part is without radula and jaw-plates. The central nervous system is situated between the pharyngeal bulb and oesophagus.

This species has been recorded from the Indian Ocean.

Loc. Tomioka Bay (May 10, 1933; 1 specimen).

8. *Pseudobornella orientalis* Baba, 1932 (Fig. 5)

Pseudobornella orientalis Baba, Annot. Zool. Japon., Vol. 13, no. 4, 1932, pp. 369–376, figs. 1–7.

The body (fig. 5) measures about 10 mm in the living condition. The head bears a pair of oral processes, the tips of which are divided into 3 papillæ of unequal length. The rhinophore-sheath is remarkably elevated, bearing 1 perfoliated rhinophore and 3 papillæ, of which 2 are lateral and moderate in length and 1 is posterior and strikingly elongated to as much as 5 times the length of the body. On the back there are 4 pairs of papillæ which are accompanied by a moderate number of simple or often branched branchial leaflets on the inner side. The foot is large and expanded.

The body above is slightly yellowish white with chocolate mottles and yellowish white striations.

Loc. Tomioka Bay (May 1, 1933; 1 specimen).

9. *Melibe vexillifera* Bergh, 1880

Melibe vexillifera Bergh, Verh. k. k. zool.-bot. Gesell. Wien, Bd. 30, 1880, pp. 10 (162)–13 (165), Taf. 2, figg. 1–11, Taf. 3, figg. 1, 2; Eliot, Journ. Coll. Sci. Imp. Univ. Tôkyô, Vol. 35, art. 1, 1913, p. 37, Pl. 2, fig. 11; Hirasé; Mollusca, 1927, p. 1475, fig. 2837.

This species was recorded in Japan from Enoshima and Misaki. Loc. Oniike Bay (Aug. 26, 1933; 3 specimens).

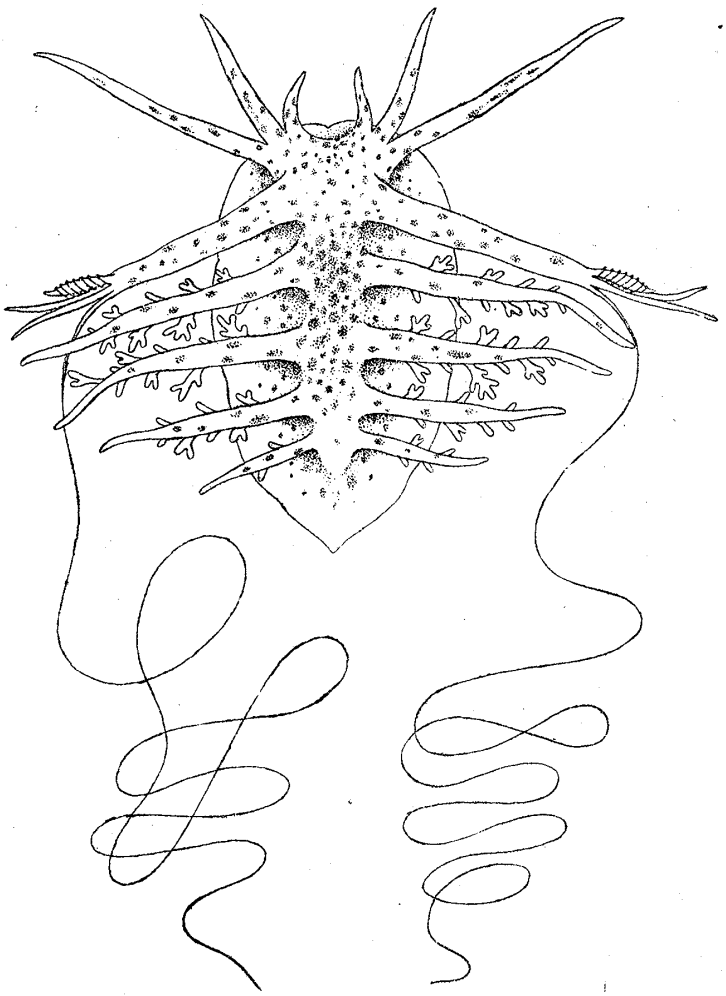

Fig. 5.—*Pseudobornella orientalis* Baba. × 5.

10. *Cuthona bicolor* Bergh, 1904 (Fig. 6)

Cuthona? *bicolor* Bergh, Mal. Unters., Bd. 9, Th. 6, Lief. 1, 1904, pp. 3–5, Taf. 1, figg. 32–36.

The body (fig. 6, a) in life is about 20 mm in length. Both the oral tentacles and rhinophores are slender and smooth. The branchial papillæ are arranged in 15 oblique rows on both sides of the back. The anus is situated between the 6th and 7th branchial rows and the genital opening below the 5th branchial row on the right side. The antero-lateral corners of the foot are produced and angulated. The

anterior margin of the foot is grooved transversely, the upper lip being notched in the middle.

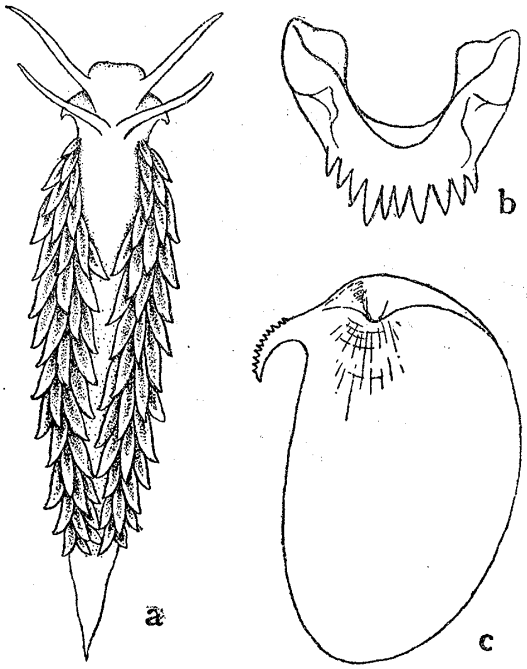

Fig. 6.—*Cuthona bicolor* Bergh. a. Dorsal view. × 3. b. Radula. × 150. c. Jaw-plate. × 15.

The body above and the sole are tinged with orange-yellow. The oral tentacle bears a whitish streak; the branchial papillæ are orange-yellow with a dark blue vein and a white tip.

The jaw-plates (fig. 6, c) are in a pair, their masticatory processes being slender and provided with a series of denticles. The radula formula is 70 × 0.1.0; the tooth (fig. 6, b) is horseshoe-shaped, bearing about 10 denticles on the anterior margin.

The orginal specimen was recorded from the Japan Sea (between Vladivostok and Nagasaki)..

Loc. Tomioka Bay (April 27, 1933; 1 specimen).

11. *Phyllodesmium hyalinum* Ehrenberg, 1831 (Fig. 7)

Phyllodesmium hyalinum Ehrenberg, Symb. Phys., 1831; Bergh, Naturh. Foren. videnskab. Meddel., 1860, pp. 1–14, figg. 1–17; Eliot, Proc. Zool. Soc. London, 1904, p. 289; Bergh, Mal. Unters., Bd. 9. Th. 6, Lief. 2, 1905, pp. 60–61, Taf. 7, figg. 13–17.

The body (fig. 7, a) in the living state attains the length of about 25 mm. Both the oral tentacles and rhinophores are slender and smooth. The branchial papillæ are fusiform with blunt tubercles on the surface and are arranged in 7–8 groups on both sides of the back. The anus is situated in the centre of the 2nd branchial group and the genital orifice below the 1st branchial group on the right side. The antero-lateral corners of the foot are produced slightly; the anterior margin of the same is grooved transversely and the upper lip is notched in the middle.

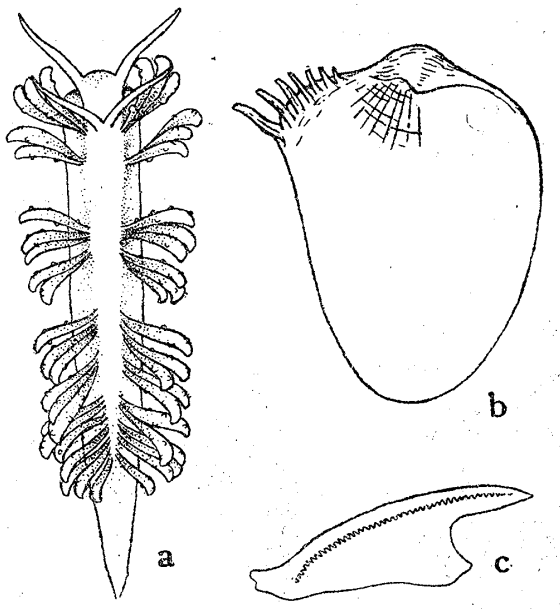

Fig. 7.—*Phyllodesmium hyalinum* Ehrenberg. a. Dorsal view. × 2. b. Jaw-plate. × 20. c. Radula. × 70.

The back is yellowish white with a trace of an orange-yellow colour. The oral tentacles and rhinophores are bluish white. The branchial papillæ are also bluish white and veined with dark purple.

There are a pair of jaw-plates (fig. 7, b), the masticatory processes of which are provided with about 7 prominent denticles. The radula formula is 20 × 0.1.0, the tooth (fig. 7, c) bearing a series of denticles on the margin.

Our specimen is referred to *Phyllodesmium hyalinum* Ehrenberg, recorded from the Red Sea and Indian Ocean, because of its close resemblance in the external form of the body and in the characters of radula and jaw-plates.

Loc. Tomioka Bay (April 27, 1933; 1 specimen).

12. *Baeolidia japonica*, nov. sp. (Fig. 8)

This Aeolid, attached to *Sargassum*, was collected by Professor Ohshima.

The body (fig. 8, a) in life is small and measures about 12 mm in length. The oral tentacles are slender and smooth, while the rhinophores are provided with small processes on the surface. The branchial papillæ are somewhat compressed and arranged in 5 groups on either side of the back. The foot at its anterior margin is grooved transversely and the upper lip is notched in the middle; the antero-lateral corners are produced into horns.

The body including oral tentacles, rhinophores and branchial papillæ are dark brown with whitish spots.

The jaw-plates (fig. 8, b) are in a pair; their masticatory processes are smooth. The radula formula is $23 \times 0.1.0$; the tooth (fig. 8, c) is curved and is provided with a series of comb-like denticles on the anterior margin.

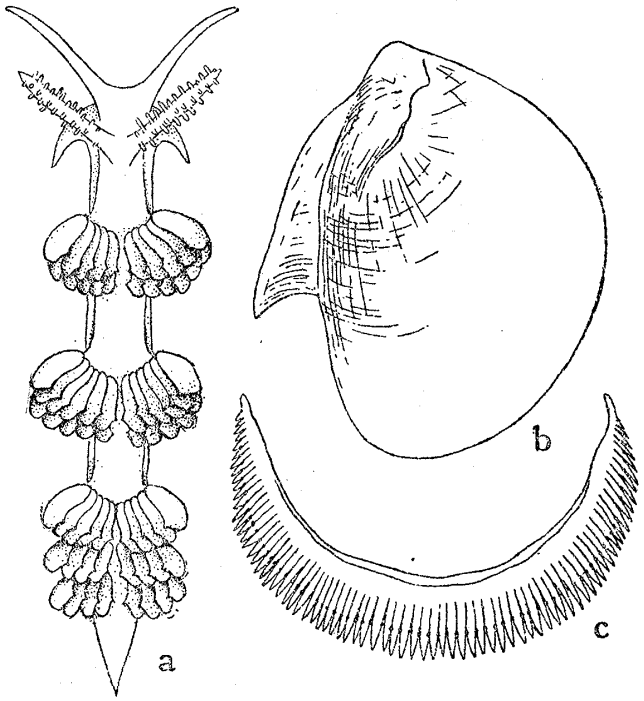

Fig. 8.—*Baeolidia japonica*, nov. sp. a. Dorsal view. × 7. b. Jaw-plate. × 15. c. Radula. × 100.

The Aeolid in hand differs from *Baeolidia major* Eliot (see my previous paper in Annot. Zool. Japon., Vol. 14, No. 1, 1933, p. 178), being (1) smaller in the size of body, (2) fewer in the number of branchial

groups and (3) narrower in the tooth of radula. It resembles *Baeolidia moebii* Bergh from Mauritius (Bergh) and the Suez Canal (O'Donoghue) (1) in the small size of body, (2) in the compressed form of branchial papillæ and (3) in the form of radula, but differs (1) in the coloration of the body, (2) in the position of genital orifice and of anus and (3) in the number of branchial groups.

Loc. Tomioka Bay (Aug. 28, 1933; 1 specimen).

III. LITERATURE

The papers referred to in my previous work (Annot. Zool. Japon., Vol. 14, No. 1, 1933) are omitted here. The asterisk (*) indicates the paper which was not accessible to me.

Alder, J. and A. Hancock 1846 A monograph of the British Nudibranchiate mollusca. Pt. 3. Ray Society.

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Cheeseman, T. F. 1881 On some new species of Nudibranchiate mollusca. Trans. Inst. New Zealand. Vol. 13.

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MacFarland, F. M. 1905 A preliminary account of the Doridida of Monterey Bay, California. Proc. Biol. Soc. Washington, Vol. 18.

Suter, H. 1913 Manual of the New Zealand Mollusca.